

**Scotland's Rural College**

## **SAC Cereal Recommended List for 2008**

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Print publication: 01/12/2007

### *Document Version*

Publisher's PDF, also known as Version of record

[Link to publication](#)

### *Citation for pulished version (APA):*

Cranstoun, D., & Hoad, SP. (2007). *SAC Cereal Recommended List for 2008*. (SAC Cereal Recommended List for 2008). SRUC.

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## INTRODUCTION

Recommendations are made by SAC and are based on data collected as part of the HGCA Recommended Lists' system. The full data collected and the HGCA Recommended Lists are available on the HGCA website ([www.hgca.com](http://www.hgca.com)): this includes information on varieties not mentioned on the SAC list. Some of the detailed agronomy advice is based on HGCA's RL Plus 'varieties on your farm' this interactive programme is available on the HGCA website and the CD HGCA Crop Oracle.

To improve the regional application of cereal trials, the UK is divided into several regions. The yields on page 8 are based on trials in the arable east to the north of Durham. For minor crops the yields are UK yields; the spring wheat yields are from spring-sown trials.

A variety is not recommended until it has completed at least three years in trial. If the UK performance indicates a consistent economic benefit over the best existing comparable variety and there are no unacceptable weaknesses, the candidate is given a UK provisional recommendation (P); varieties that do not merit a UK recommendation but have a specific use are given PS. In the tables, the fully recommended varieties are listed in order of fungicide treated yield; this is expressed as a percentage of the average treated yield of specified control varieties.

A variety may demonstrate advantages or disadvantages under commercial production and marketing that are not evident in field trials. In due course this additional information is included in the notes on varieties. The disease resistance scores indicate the current situation; experience has shown that resistance to mildew and yellow rust may not be maintained.

Assessment of quality is provided by the Malting Barley Committee, the Scotch Whisky Association, the Scottish Flour Millers' Association, the Scottish Oat Millers and others assisting HGCA Crop Evaluation Committees.

Supplies of multiplication seed (Basic and Certified 1st Generation) may not be generally available; C2 seed stocks of the newer varieties may be limited.

In case of doubt, or for information about varieties not listed, farmers should consult their SAC agricultural advisers or the HGCA website.

## CHOICE OF VARIETY

Before choosing a variety consider the following factors and decide which restrict your choice:

- Sale for brewing, distilling or milling (check with your buyer).
- Specific weight.
- Earliness or need to spread the harvest period.

- Ear loss and sprouting risks.
- Disease risk (see below).
- Straw strength and length (barley straw can be of considerable value).

Having eliminated the inappropriate varieties, select from the remainder those with the highest yield potential.

There is a large wheat market for grain whisky production in Scotland. Although some hard wheat may be used, this can cause processing problems so there is a strong preference for **soft** grain of large grain size, low protein content, with good specific weight and low screenings. Ratings for distillery performance range from Good for Istabraq to Poor for all hard wheat varieties and those soft wheat varieties carrying the 1b/1r rye gene translocation; hard wheat varieties and those giving a reduced alcohol yield, or process limitation, are discouraged by distillers. Grain whisky production also uses high enzyme malted barley: sourced from Scotland, Decanter dominates this sector but Maresi is also used and recently Tartan has been Provisionally Approved for this market.

For biscuit-making, soft wheat is preferred. The Hagberg Falling Number should exceed 100, protein should be above 10.7% (on a dry matter basis using the Dumas method) and the gluten must not be damaged by high temperature drying.

There is also demand for bread wheat but only if quality specifications are fully met. Because of our climate, Scottish wheat is generally lower in protein than its English counterpart. In wet harvests the Hagberg Falling Number is so severely reduced that grain is unlikely to meet bread-making requirements.

To assist exports and help foreign millers and bakers recognise the characteristics of UK varieties, HGCA is promoting two brands. **uks** covers soft extensible varieties that can be used for biscuit-making or blended into a bread-making flour. **ukp** covers semi-hard varieties that suit both EU and non-EU bread-making.

The intervention market for wheat is restricted to common wheat; Cordiale, Einstein, Malacca and Solstice are eligible for intervention.

Quality requirements are becoming more precise especially as characters affecting processing are taken into account. In the malting barley market some varieties are acceptable for distilling but not for brewing. Some varieties are inclined to dormancy, this can prejudice their use by maltsters. Others are prone to splitting and skinning; both conditions may lead to rejection by maltsters. The IBD Approval system (formerly IoB Approval system) is now based on malt use with Approval lists for brewing and distilling (table). As part of product protection, the Scotch Whisky Association will not support varieties which produce GN levels significantly above Optic; the distilling industry's long term requirements will be for GN 'non-producing' varieties such as Appaloosa, Belgravia, Decanter, Oxbridge and Tartan. An asterisk indicates that a variety carries Approval based on a minimum number of satisfactory commercial scale tests. (\*1) is Provisional Approval based on satisfactory micro-malting or lab results; a variety is moved to Stage 2 Provisional Approval (\*2) if the initial commercial scale tests are satisfactory.

There is some demand for winter malting barley for brewing but in practice only a small proportion of the Scottish crop meets the grain nitrogen and other specifications. The Malting Barley Committee will grant IBD Approval to winter barley for brewing, Pearl is the only currently Approved variety in Scotland.

About 80% of the oats that are sold go for milling. To meet this market it is important that grain is properly dried **before** quality is impaired. Milling specifications are likely to include specific (or bushel) weight and screenings in addition to moisture content, but in some markets kernel content and freedom from discoloured groats are very important. There is a developing market for PGR-free oats.

Specific weight is important in the marketing of grain, particularly for intervention; it is very dependent on growing conditions. High specific weight varieties are less likely to incur discounts or risk rejection.

## REDUCING DISEASE RISK

***(a) The most economic way of avoiding yield loss due to disease is to grow disease resistant varieties.***

Disease ratings are calculated from assessments of disease in naturally infected trials throughout the UK and in inoculated tests. Ratings are UK ratings on a 1-9 scale, where 9 indicates good resistance and 1 poor resistance. A rating is an indicator of disease risk. It describes the likely severity of infection when conditions favour disease development and compatible races of the disease are present. Where conditions are less favourable to a particular disease, or compatible races are absent, a variety may appear more resistant than indicated by its rating. Occasionally, a variety may be less resistant than expected due to the emergence of a new race of disease that overcomes its resistance.

Varieties with a rating of 8 or 9 are sufficiently **resistant** that the disease is unlikely to reduce yield.

Varieties with ratings of 6 or 7 are **moderately resistant**. Disease may develop under favourable conditions, but yield is unlikely to be substantially reduced.

Varieties with ratings of 4 or 5 are **susceptible** and are likely to become severely infected under conditions favourable to the disease. Fungicides will probably be required.

Varieties with ratings of 1, 2 or 3 are **very susceptible** and are likely to become severely infected. Such varieties initiate epidemics. Routine fungicide treatment will be necessary.

Variety resistance can sometimes break down within season. This is most likely to happen where a variety relies on a single major gene for its resistance. If this occurs the rating may change from 9 (good resistance) to 4 or lower (susceptible). Winter barley varieties with *Rhynchosporium* resistance ratings of 6, 7 and 8 should be regarded as susceptible and those varieties with 5 or less are very susceptible. Varieties of winter barley susceptible to

mildew, yellow rust, brown rust, *Rhynchosporium* net blotch or *Ramularia* may act as sources of infection for spring barley crops. Fungicides applied in the spring to winter barley will reduce disease spread to spring barley. Spring barley varieties susceptible to the prevalent diseases will also need to be protected by fungicide seed treatment or sprays.

*Septoria tritici* is currently the most common disease of wheat. Recent issues concerning fungicide resistance to strobilurin (QoI) fungicides and triazole (DMI) fungicides mean that varietal resistance is becoming more important to manage this disease: Robigus (rated 7) and Alchemy (rated 6) are the most resistant of the recommended varieties.

*Septoria nodorum* has declined as a significant disease of winter wheat, however it can still occur and may be overlooked as symptoms are less easy to identify than those of *Septoria tritici*. Consort and Cordiale are the most susceptible recommended varieties to *Septoria nodorum* (resistance ratings 4 and 5).

### **(b) Diversification of varieties**

#### **Principles of variety diversification:**

Overall levels of certain diseases, especially barley mildew and wheat yellow rust are increased if the more susceptible varieties are grown. The risk from these diseases is reduced if more than one variety of barley or wheat is sown, provided varieties which are to be grown in adjacent fields in the same year, or in the same field in successive years, or in a mixture, are not susceptible to the same races of the pathogens.

On the basis of information supplied by the UK Cereal Pathogen Virulence Survey, barley varieties have been grouped into Diversification Groups (DG) according to the races of mildew which attack them. Wheat varieties have been grouped according to the races of yellow rust to which they are susceptible as adult plants. These diversification groups are shown in the table.

#### **Winter wheat yellow rust:**

Yellow rust is a serious threat to yield in certain varieties. The sudden appearance of new races on previously resistant varieties can occur and regular inspection of all varieties is important, irrespective of rating. This is particularly the case in 2008 now that yellow rust has reappeared as a common problem in winter wheat.

**The risk of spread of yellow rust is low where Alchemy, Istabraq, Malacca or Solstice are grown together or with any one other recommended variety. The risk of spread is also low where one variety from DG4 (Cordiale) is grown with one variety from DG7 (Consort & Robigus) or one variety from DG10 (Einstein and Oakley).**

**There is a high risk of spread from any other combination of recommended varieties. Robigus (resistance rating 3) and Consort (resistance rating 7) are both in Diversification Group 7; if yellow rust develops on Robigus, there is a high risk that it will spread to Consort.**

### **Barley mildew:**

Varieties in Diversification Group 0 (Accrue, Bronx, Camion, Pearl, Pelican and Retriever) do not contribute to the diversification of varieties to reduce the effect of mildew on the crop but note that DG0 varieties with high resistance ratings eg Pelican are effective at limiting the potential of an epidemic.

Varieties in Diversification Group 1 (Appaloosa, Belgravia, Decanter, NFC Tipple, Publican, Quench, Riviera, Scout, Waggon, Westminster and the winter barley Amarena) are currently resistant to mildew and are good partners to all varieties.

Varieties in Diversification Groups 3 (Doyen), 4 (Cocktail), 9 (Optic), 10 (Boost, Saffron or Sequel) and 14 (Oxbridge or Rebecca) may be grown with Amarena or any of the other recommended spring varieties on the SAC list apart from those in the same DG.

### **EYESPOT AND SHARP EYESPOT**

Recent research has developed a risk assessment for eyespot; it is available at [www.sac.ac.uk/crops](http://www.sac.ac.uk/crops). High risk factors include wheat or another cereal as the previous crop, ploughing compared to minimal tillage, early sowing, high spring rainfall and the presence of disease at GS31-32. Absence of disease at GS31-32, either visually or by diagnostic assessment, does not necessarily pose a low risk.

**Sharp eyespot** is less common, but when infection is severe, yield loss and lodging can occur. All varieties of wheat are susceptible to some degree.

### **SNOW ROT**

Snow rot has receded as an important disease of winter barley but a move to short rotations, earlier sowing and minimum cultivations would encourage it. There is insufficient evidence to give susceptibility ratings. Consideration should be given to the protection of advanced lush crops especially where the previous crop was winter barley, snow is likely to lie or where crops are weakened by manganese deficiency.

### **SEED-BORNE DISEASES**

**Loose smut** is a seed-borne disease found mainly on open-flowering barley varieties (most winter and spring varieties). Certified seed will have a guaranteed low incidence of loose smut but infection can build up rapidly in home-saved seed.

**Leaf stripe** became common in spring barley in 1990. Adoption of a voluntary standard for seed infection and the use of effective seed treatments has resulted in a significant reduction in its incidence; however, the disease remains a threat to spring barley.

Recent research has shown that *Rhynchosporium* and *Ramularia* can be seed-borne. *Rhynchosporium* on the seed can lead to widespread infections on winter barley in February.

Where loose smut or leaf stripe is found in a growing crop from which seed is to be taken, the seed should be tested for these diseases at the Official Seed Testing Station for Scotland, 1 Roddinglaw Road, Edinburgh EH12 9FJ.

**It is recommended that all winter wheat seed is treated to protect against *Microdochium nivale* and Bunt.**

## **BARLEY SPOTTING**

Barley spotting has been common on several varieties in the last decade causing yield loss and high screenings. Spotting appears on the upper leaves at ear emergence; in extreme cases the top two leaves die. This damaging effect can be significantly reduced if protectant fungicides (e.g. triazoles & chlorothalonil in mixtures) are applied at the boot stage before ear emergence, but not all forms of spotting respond to fungicide treatment. These fungicides will improve green leaf area retention, but it is common for spots to appear late in the season in some varieties. Some fungicides (e.g. mildew eradicates) may even reduce green leaf area if applied late in the season under certain circumstances. Varieties have been categorised for their resistance to leaf spots and also for green leaf area retention.

In recent years, barley spots developed late in the season in winter barley causing early loss of green leaf area; this problem can be minimised with fungicides as used on spring barley. Of the recommended winter varieties, Retriever is the most susceptible to *Ramularia*, Saffron is the least affected.

## **BARLEY MILD MOSAIC VIRUS**

This virus (BaMMV) and the close relative BaYMV are carried by a soil-borne fungus and can cause serious losses in winter barley. BaMMV is present on a small number of farms in Aberdeenshire and East Lothian. Use of resistant varieties is the only method of preventing the disease. The varieties on the SAC list that are resistant to the common strain are Boost, Bronx, Pelican, Retriever and Sequel. For further details about other resistant varieties see the HGCA website or Recommended List.

## **ERGOT**

Ergot can affect all cereals and it is common in seasons where the flowering period is extended by cool wet weather. It is becoming common and this is serious as some users have zero-tolerance at intake. Ergot has been reported in a range of varieties. Maresi appears particularly vulnerable. In inoculated tests Cocktail, Decanter, Doyen, Oxbridge, Riviera and Westminster showed symptoms. Triticale poses the highest risk, as do infertile secondary tillers. Grass-margins, grass weeds, set-aside and contaminated seed are potential sources of ergot.



## ORANGE BLOSSOM MIDGE

Orange blossom midge was rare in Scotland but it has been seen in crops as far north as Tayside since 2006 so growers should be alert to it in future. Robigus and Oakley have genetic resistance to this pest, so do other varieties; see the HGCA website or Recommended List.

## VARIETY RESPONSE TO DISEASE CONTROL

All trials include treated plots assessed for yield. As only a few trials have untreated plots that are assessed for yield, the untreated yield column in the tables has been changed to indicate the UK yield penalty where treatment is not provided.

The programmes of fungicides for barley and wheat are comprehensive; the intention is to keep all diseases to a minimal level throughout the growing season thus allowing maximum yield potential to be achieved. For spring barley the programme consists of a two or three-spray programme depending on mildew and *Rhynchosporium* pressure. For winter wheat it is a three or four-spray programme and for winter barley a three or five-spray programme depending on disease incidence or risk. For oats it is a two or three-spray programme.

## SPRING BARLEY

### IBD support for distilling and brewing

COCKTAIL (New Farm Crops, Syngenta, Market Stainton)

Fully recommended and IBD Approved for both brewing and malt distilling with a malt extract slightly above Optic; it shares Optic's tendency to low nitrogen grain but in some years high screening losses could limit its market. Like Optic, it is classed by distillers as a low GN producer. It is still used for brewing in England with over 20% of the market. In Scotland distilling use is limited with a market share of only 2% in 2007; check with your buyer as at least one maltster has a requirement in 2008. It may have some export potential. It is slightly earlier than Optic with better resistance to brackling and ear loss. It is shorter than Optic, stiffer and has a profuse tillering habit that adds to the pressure on screenings in some years, especially if sown late. Resistance to mildew is rated 7; it may need protection with fungicide. It is potentially weak for yellow rust. It is vulnerable to *Ramularia* and has poor green leaf area retention. It showed ergot symptoms in inoculated tests. It has good BYDV resistance. It is well adapted to a range of situations with early sowing being preferable to limit screening losses.

BELGRAVIA (Nickerson, Rothwell)

A new provisional recommendation. As a GN non-producer it is of interest to the distilling industry especially as it may have sufficient enzyme to replace Decanter for grain distilling. Based on micro-malting results it could also find a market in the brewing industry. It may also have a market for pearling. It rates well for disease resistance apart from brown rust and has only a small yield penalty if untreated. Straw is tall and rather weak.

#### OPTIC (New Farm Crops, Syngenta, Market Stainton)

IBD Approved for both brewing and malt distilling; it has markets across a wide band of nitrogen content as it is also recognised as an export variety. It is classed by distillers as a low GN producer. Its share of the Scottish malting market in 2007 was over 40%; in England its market share is just over 30% with NFC Tipple and Quench likely to overtake it. Its tendency to low nitrogen is attractive to distillers. Mildew resistance is poor especially at the seedling stage: it is vulnerable to *Rhynchosporium*, *Ramularia* and brown rust but is less affected by abiotic spotting. It is later than average but in recent years the trend has been to breed varieties of similar or even later maturity! Brackling can be a problem in a delayed harvest. It has good resistance to BYDV. It is a rather high tillering variety so high seed rates should be avoided. Optic is relatively higher yielding on lower potential and in lower lying situations; it does less well in SW Scotland.

#### **IBD support for distilling only**

#### PUBLICAN (New Farm Crops, Syngenta, Market Stainton)

A very high yielding provisional recommendation. Based on micro-malting results it now has IBD Provisional Approval for distilling; the analysis also indicates it could be used for brewing but is unlikely to gain IBD Approval for brewing. Like Optic, it is classed by distillers as a low GN producer. On limited data, its grain nitrogen tends to be above Optic so growers should be cautious over nitrogen rates. Screening losses are likely to be relatively low. It has good resistance ratings for mildew and *Rhynchosporium*, but low ratings for yellow and brown rust. It has good green leaf area retention and resistance to abiotic spotting. It shares Optic's maturity rating. The straw is above average length and has shown signs of weakness in some trials. It yields relatively better on lighter, lower potential soils and in lowground areas.

#### APPALOOSA (Nickerson, Rothwell)

Still a provisional recommendation following some very disappointing yields in 2007. It is a GN non-producer and now has full IBD Approval for malt distilling. Screenings are higher than average but it tends to produce grain at the lower end of the nitrogen range. Providing the barley analysis meets requirements, it should find a ready distilling market especially for those distilleries that don't use Oxbridge. As it does not have support for brewing or grain distilling, growers should concentrate on low nitrogen malt distilling requirements. It is very vulnerable to *Rhynchosporium* but carries useful resistance to mildew, yellow rust and *Ramularia* as well as having good green leaf area retention. Maturity is slightly earlier than Optic. It has stiff straw with good resistance to brackling. Although late sowings tends to increase screening losses, Appaloosa maintains its yield well in late sowings. It yields relatively well on heavier lowground soils.

#### OXBRIDGE (Nickerson, Rothwell)

In 2007 trial yields were very disappointing and some bulks were severely skinned limiting their use for distilling. Fully recommended with IBD Approval for malt distilling as a non-producer of GN with a high spirit yield. Certain distilleries have experienced processing problems with Oxbridge so it is important to check that your buyer is willing to use this variety. It has low screening losses. With a low DP it is unlikely to be used for brewing or

grain distilling so growers should concentrate on the lower part of the nitrogen spectrum; it tends to produce grain at the lower end of the nitrogen range. Its large grain size is attractive for pearling where it may have a market if the grain nitrogen is above the malt distilling specification. It is in DG14 for mildew, rated 7 and may need protection; it has better than average *Rhynchosporium* resistance; it has moderate ratings for *Ramularia* resistance and abiotic spotting but was poor for green leaf area retention in 2007. It is moderately vulnerable to yellow rust. It showed ergot symptoms in inoculated tests. It has stiff straw, good resistance to brackling and is a little earlier than Optic. It is well adapted to early sowing, heavier soils, high potential sites

#### DECANTER (Nickerson, Rothwell)

IBD Approved for malt distilling, it is the only recommended variety suitable for grain distilling at present where there is an additional requirement for high grain nitrogen. It is a GN non-producer. It is maintaining a 5% share of the Scottish malt market and has the advantage of markets across a range of nitrogen contents but it no longer carries IBD Approval for brewing. There is a specific requirement from several malt distilleries for low nitrogen non-producers of GN but these distilleries are more likely to source Oxbridge and Appaloosa as low nitrogen Decanter has been in short supply. Small grain size can result in high screening losses over the conventional 2.5mm screen; it is sometimes traded over a smaller screen. Husbandry measures such as early sowing, reducing the seed rate and delaying the nitrogen top-dressing have a beneficial effect on screening levels. It has good ratings for resistance to *Ramularia*, brackling and retention of ears. Mildew resistance is good. It showed ergot symptoms in inoculated tests. It has stood well in recent Scottish trials and appears suited to upland conditions.

#### **IBD support for grain distilling**

In addition to fully Approved Decanter (see above), a new variety TARTAN has been given IBD Stage 1 Provisional Approval solely for grain distilling.

#### TARTAN (Nickerson, Rothwell)

Based on recent micro-malting results Tartan has sufficient enzyme to replace Decanter in grain distilling and it has the benefit of much lower screening levels. In the field it has outyielded Decanter by a small amount, insufficient to compete with other GN non-producers in the malt distilling market. Its disease spectrum is similar to Appaloosa, good for mildew but very weak for *Rhynchosporium*. It is early, possibly as early as Riviera. Straw length is average but stiff with good resistance to brackling.

#### **IBD support for brewing only**

#### QUENCH (New Farm Crops, Syngenta, Market Stainton)

A very high yielding provisional recommendation. Based on micro-malting analysis, it now has IBD Stage 1 Provisional Approval for brewing: it will not qualify for distilling support as it does not meet the requirement for limiting GN. Within the brewing industry, there is considerable enthusiasm for this variety assuming it successfully completes the commercial

malting and brewing tests on bulks from the 2007 harvest. Its straw is shorter than average but carries good resistance to brackling. *Rhynchosporium* resistance is above average but it is potentially vulnerable to both yellow and brown rust.

#### NFC TIPPLE (New Farm Crops, Syngenta, Market Stainton)

A high yielding recommendation with full IBD Approval for brewing; its market share in England exceeded 25% in 2007. It has potential in some export malt markets but is unlikely to be used by the distilling industry as it does not meet the requirements for limiting GN. It is rather short for a feed variety but the straw is stiff with good resistance to brackling; green leaf area retention is good. It has good resistance to mildew, brown rust, *Ramularia* and abiotic spotting but weak resistance to *Rhynchosporium* and it is potentially weak for yellow rust. It has potential for pearling but acceptability is very dependent on the sample. There are indications that it has done relatively better in SE Scotland and on high potential sites with a bias towards lighter soils and early sowing.

#### WESTMINSTER (Nickerson, Rothwell)

Fully recommended with IBD Approval for brewing; it has a much higher malt extract potential than the other recommended varieties. It is unlikely to be used by the distilling industry as it does not meet their new requirements for limiting GN. Growers hoping for a brewing sale should check with their buyer as commercial brewing tests have shown that this variety does not suit all brewing systems. Its main use in Scotland is likely to be as a tall feed variety with good disease resistance. Depending on sample quality, it may be taken for pearling. It is very tall but has stood well in Scotland. It has excellent resistance to both mildew and *Rhynchosporium* and good green leaf area retention, but this may contribute to late maturity. In some seasons it could be vulnerable to brown rust. It is rated highly for resistance to abiotic spotting. It showed ergot symptoms in inoculated tests. It shows potential for whole-crop. It has yielded well on heavier soils, low potential sites in SW Scotland and when late sown.

### Feed varieties

#### SCOUT (Nickerson, Rothwell)

A new provisional recommendation based on its very high yield potential. Some of its other characters are less encouraging. Straw length is average with indications of weakness during National List testing. It is later than Riviera and Waggon. *Rhynchosporium* resistance is poor and it is potentially very vulnerable to yellow rust.

#### WAGGON (New Farm Crops, Syngenta, Market Stainton)

A fully recommended UK variety. It is a very high yielding feed variety. Depending on sample quality it may be taken for pearling but in 2007 it was too yellow. There are concerns about its low rating for *Rhynchosporium* resistance especially in the West of Scotland where its infection levels are generally worse than Optic: in the East its infection levels have been lower and it has appeared to be more resistant. Its straw is of average length, stiff with a good rating for brackling resistance. It is earlier than Optic but not as early as Riviera. Apart

from *Rhynchosporium*, disease resistance is good and so is its green leaf area retention. It maintains its yield over a range of situations and performs well after a break-crop, on high potential sites and when late sown.

REBECCA (Nordsaat, Germany/ Saaten Union UK Ltd, Newmarket)

This recommended feed variety has produced high yields in the arable East of Scotland. Specific weight is rather low. Straw length is similar to Riviera. It is stiffer but has a much lower rating for brackling: this defect is less significant in such a tall variety and brackling can protect against ear loss. Maturity is average. Mildew has become an increasing problem in recent years; recently downgraded to 6, it has been reclassified to DG14 as it is vulnerable to the same mildew race as Oxbridge. *Rhynchosporium* resistance is above average. It is potentially vulnerable to yellow rust. It is rated good for retention of green leaf area. It tends to suit low yielding, lighter textured sites especially those following a cereal. It has also done relatively better in NE Scotland.

DOYEN (New Farm Crops, Syngenta, Market Stainton)

This feed variety is beginning to look a bit overshadowed both for yield and disease resistance. The straw is short but stiff with good resistance to brackling. It has been reclassified into mildew DG3. Although its *Rhynchosporium* rating remains at 7, there are potential vulnerabilities so growers should react to any unexpected appearance of *Rhynchosporium* in Doyen. It is potentially vulnerable to yellow rust. It shows good resistance to abiotic spotting. It showed ergot symptoms in inoculated tests. It is not a profuse tillering variety. It has yielded relatively better in the North of Scotland, on heavier soils, in high yielding situations and when early sown.

RIVIERA (RAGT Seeds Ltd., Cambridge)

A rather erratic feed variety that continues to yield very well in the West, elsewhere it is outclassed. Sometimes it is acceptable for pearling. It is early, tall and likely to need stiffening. It has only moderate resistance to *Rhynchosporium*. It showed ergot symptoms in inoculated tests. It is readily infected with BYDV. It is better adapted to low-ground situations, heavier soils and areas of lower potential.

## WINTER BARLEY

### IBD Approval for brewing

PEARL (Nickerson, Rothwell)

Carries IBD Approval for brewing; Pearl is the dominant malting winter barley variety with over 60% of the UK market. There is some Scottish interest in Pearl for brewing but growers should note that dormancy limits its use. It is the tallest recommended two-row variety, with rather weak straw if not grown with a malting specification in mind. It ripens late. It is susceptible to winter-kill and net blotch. Pearl no longer contributes to mildew diversification, it is susceptible at the seedling stage but has good adult plant resistance. It is sometimes used in blends to improve the specific weight of some of the six-row varieties.

## Six-row feed varieties

BRONX (New Farm Crops, Syngenta, Market Stainton)

This provisionally recommended six-row variety is a hybrid, it heads the Recommended List for yield. It has a moderate specific weight with a very high proportion of small grains. It is tall with very weak straw. Apart from brown rust, foliar disease resistance is good and it has resistance to BaMMV.

PELICAN (Nordsaat, Germany/Saaten Union UK Ltd, Newmarket)

This provisionally recommended six-row variety has a low specific weight, similar to Amarena. It is very high yielding. The straw is tall; it isn't as early maturing as the other six-row varieties. On current evidence it looks rather vulnerable to yellow rust, net blotch and *Ramularia* and scored badly for green leaf area retention in an untreated trial but it still has the highest untreated yield on the recommended list. It has resistance to BaMMV. Yield performance has been relatively better on heavy soils and in SE Scotland.

BOOST (New Farm Crops, Syngenta, Market Stainton)

This fully recommended six-row variety is a hybrid. It has a high specific weight, almost comparable with Sequel and much lower screening losses. It has resistance to BaMMV. Other than for brown rust it has similar or better resistance to all other foliar diseases and lodging. It has average vulnerability to *Ramularia*. It looks suitable for pearling providing the colour isn't too yellow. Yield performance has been relatively better in NE than SE Scotland.

AMARENA (Saaten Union Recherche, France /Saaten Union UK Ltd., Newmarket)

This full recommendation is a six-row variety with a low specific weight. It is stiff. It has a high untreated yield; mildew resistance is exceptionally good, yellow rust and *Ramularia* are weaknesses. It does not have BaMMV resistance. It has moderately good winter-hardiness. It does relatively better in NE Scotland and has been disappointing in England.

SEQUEL (New Farm Crops, Syngenta, Market Stainton)

This fully recommended six-row variety retains its place because of its high specific weight; screening losses are rather high. It is early with useful BaMMV resistance but resistance to brown rust and *Ramularia* is only moderate. Bold samples may be accepted for pearling. It yields relatively better in NE Scotland.

## Two-row feed varieties

RETRIEVER (Sejet, Denmark/Nickerson, Rothwell)

This provisional recommendation is a two-row feed variety, it has produced outstanding yields that seriously challenge the six-row varieties. In some trials Retriever has looked disappointing but still produced excellent yields. Specific weight is rather low and screening levels are high compared with other recommended two-row varieties. It may have some potential for pearling provided the colour isn't too yellow. Although it is relatively short, it has weak straw and a good stiffening response to pgr. Its high figure for yield loss if untreated also reflects vulnerabilities to mildew, brown rust and *Ramularia*. Winter hardiness is

provisionally rated above average. It tends to yield relatively better on low potential sites after cereals, light soils and in NE Scotland.

ACCRUE (Saaten Union Recherche, France /Saaten Union UK Ltd., Newmarket)

This two-row feed variety is a provisional recommendation. It is slightly higher yielding than Saffron, even stiffer and much better for both mildew and *Rhynchosporium*, giving it a high untreated yield. Winter hardiness is provisionally rated above average. It appears to yield relatively better in SE Scotland and on high yielding, lighter textured sites.

SAFFRON (CPB Twyford Ltd., Cambridge)

This fully recommended two-row feed variety has produced yields similar to the high specific weight six-row variety Sequel. It has good resistance to net blotch and *Ramularia* but is very weak for mildew and *Rhynchosporium*. It is short, stiff and late maturing with good green leaf area retention. It is particularly suited to high potential light textured sites especially if grown after a break crop.

CAMION (CPB Twyford Ltd., Cambridge)

This two-row feed variety is becoming outclassed for yield. It has an excellent specific weight. It looks suitable for pearling. It is early, rather short and vulnerable to mildew and *Rhynchosporium*. It has yielded relatively well on upland sites especially in NE Scotland and when sown early.

## WHEAT

### Soft textured varieties are preferred by the distilling industry

ISTABRAQ (Nickerson, Rothwell)

A very high yielding variety: it is the only listed variety rated good for distilling with an alcohol yield significantly higher than Robigus and Consort. As a nabim Group 4 variety, it is unlikely to be used for biscuit-making in Scotland but is listed for export as a **uks** variety. It has a high specific weight. The straw is tall and rather weak but it responds well to pgr. It doesn't suit very early sowing due to its weak straw and fast speed of development. As a late maturing variety, rated rather weak for sprouting resistance, avoid conditions where harvest is likely to be delayed. It has above average resistance to eyespot and *Fusarium* ear blight but vulnerability to *Septoria tritici* and especially mildew give it an above average response to fungicide. It has a relatively low vernalisation requirement. It has supported its relative yield potential over a range of sowing dates, rotations and soil textures especially in SE Scotland with a tendency to yield relatively better on low potential sites.

ALCHEMY (Nickerson, Rothwell)

A full recommendation. From previous distilling results this variety was rated medium for distilling. However results from 2007 have placed spirit yield close to Istabraq so it will be looked at again in autumn 2008 once commercial bulks have been assessed in distilleries. Placed in nabim Group 4, it is unlikely to be used for biscuit-making in Scotland but it has potential for export as a **uks** blending variety: it does not suit some export buyers as a pure variety. By soft wheat standards it is high for both specific weight and Hagberg. Its excellent

untreated yield reflected a very good spectrum of resistance to the normal foliar disease threats in Scotland but the brown rust infections of 2007 indicate a weakness that may appear again. The straw is a bit stiffer than its seven rating implies nearly reaching a nine rating with PGR. Further evidence is needed before a provisional rating can be provided for sprouting. Speed of development is slow in late sown situations. It performs relatively better if sown after a break crop in high potential situations.

#### ROBIGUS (CPB Twyford Ltd., Cambridge)

Fully recommended, this soft wheat is graded medium for distilling and is suitable for biscuit-making; it is also listed as a **uks** variety for export. It is a small grained variety so should be sown by seed number. It is rated rather weak for sprouting. Straw strength is a little weaker than Consort. It can no longer be regarded as a low input variety. It is in the same group as Consort for yellow rust but much more susceptible and in recent years has needed almost routine protection. During 2005 mildew appeared on Robigus; following further evidence its rating has been downgraded to six. Likewise its *Septoria tritici* rating has also been downgraded. *Fusarium* and eyespot resistance are both rather weak. It is the only SAC recommended distilling variety with resistance to orange blossom midge. It has a relatively low vernalisation requirement. Robigus is very high yielding in first cereal situations especially on high potential sites but its yield can be severely affected where it follows a cereal in the rotation. It is relatively better suited to lighter textured soils.

#### CONSORT (RAGT Seeds Ltd., Cambridge)

Seed availability, cost of disease control and yield are now making Consort look a bit outclassed. This soft wheat is graded medium for distilling: it is readily used for biscuit flour and has characteristics that combined with high protein are needed for certain types of biscuit. It is listed as a **uks** variety for export. It is highly susceptible to *Septoria tritici* and *nodorum* and may need protection against yellow rust if grown near the highly susceptible Robigus. It is potentially weak for brown rust. It is late ripening and has stiff straw. Against Robigus it is competitive in second cereal situations and can be sown early. It yields relatively better in SE Scotland.

### The other recommended varieties

#### OAKLEY (CPB Twyford Ltd., Cambridge)

This provisional recommendation has produced some very high yields: it a hard endosperm nabim Group 4 wheat so there is little prospect of use for distilling or milling. It has a low specific weight and Hagberg which may call into question its resistance to sprouting. It remains the weakest strawed variety on the SAC list so it needs and responds well to growth regulator. It carries low ratings for *Septoria tritici*, eyespot and *Fusarium* resistance. It should be treated as a high input variety. It has useful resistance to wheat orange blossom midge and produced some very impressive yields in 2007. It is a relatively slow developer if sown late. Its yield performance is relatively disappointing when sown after a cereal. It has yielded relatively well on lighter textured high potential sites, in early sown situations and in NE Scotland.



#### EINSTEIN (Nickerson, Rothwell)

This fully recommended hard endosperm variety is at the low end of nabim Group 2 for bread-making. It is widely used by some UK domestic millers and it has export use as a **ukp** variety with Chopin figures that readily match the requirement for blended flour. High yielding varieties of this type need special attention to nitrogen management if the protein specification is to be achieved. Specific weight and Hagberg are moderately high but not as high as Cordiale. Although the straw is moderately stiff it is vulnerable to early root lodging in some seasons as in 2004 and 2007. It has moderate all round disease resistance with *Septoria tritici* resistance tending to the weak. Resistance to *Fusarium* ear blight is relatively good. Its fast speed of development makes it better suited to later sowing. It does well as a second cereal with a bias in favour of lighter soils and lower yield potential sites.

#### CORDIALE (CPB Twyford Ltd., Cambridge)

This recommended bread-making variety is in nabim Group 2. It is unlikely to earn a differential premium as a named variety as it doesn't match Solstice for quality or Soissons for special use within the UK domestic market; it is used by some UK millers. It is listed as a **ukp** variety for export with good Chopin figures. Both specific weight and Hagberg are very high. In Scottish trial sites in 2007, it recorded very high levels of grain infertility: there were also reports of yield being seriously affected in some commercial crops especially where sown early or in conditions likely to produce forward crops – it is a relatively fast developer. It is early maturing with stiff straw, stiffer than Consort. It justifies a robust fungicide programme. It is potentially vulnerable to brown rust. It provides a useful choice as a second cereal especially on lighter soils.

#### SOLSTICE (Nickerson, Rothwell)

Regraded to nabim Group1 it is now the main quality bread-making variety. This **ukp** variety can also be sold into export markets. Specific weight and Hagberg are moderately high but not as high as Cordiale. It has good resistance to sprouting. It is weak for mildew, brown rust and eyespot. It suits early sowing as its speed of development is slow and the straw is stiff but eyespot needs attention.

#### MALACCA (CPB Twyford Ltd., Cambridge)

With Solstice now in nabim Group 1, Malacca is looking outclassed both for yield and the risk of failing market specifications for specific weight and protein. Comparable to Hereward for bread-making quality; it has sometimes produced slightly yellow flour. Malacca is listed for export as a **ukp** variety suitable for blending. It is early. Avoid high seed rates as this variety supports a high proportion of fertile ears per plant and has a small grain size. It yields relatively better on lighter soils, in lower yielding situations and following a cereal.

*Winter varieties require vernalisation (some cold weather); this requirement limits their use for spring sowing. The latest safe sowing date in Scotland is likely to be at the end of February with varieties such as Istabraq and Robigus at the safer end of the spectrum. Spring varieties develop without needing vernalisation, they can be sown later in the spring but this leads to an even later harvest. The table lists UK data for available recommended quality varieties.*

TYBALT (Wiersum, Netherlands/Nickerson, Rothwell)

A nabim Group 2 recommendation with a very impressive yield. With its very high yields, additional nitrogen will be required to meet the protein specification as it is a full percent below Paragon. Growers should note a provisionally very low rating for straw strength especially when sown in the late autumn. The specific weight risks being below the marketing standard.

ASHBY (CPB Twyford Ltd., Cambridge)

A nabim Group 2 variety with no significant agronomic weaknesses but becoming outclassed by Tybalt; it has a better specific weight than Tybalt. It matches Tybalt's yield when sown in late autumn.

PARAGON (RAGT Seeds Ltd., Cambridge)

The only fully recommended nabim Group 1 spring variety. As a late autumn sown variety it is 7% lower yielding than Solstice while sown in spring it is 15% below Tybalt. It has no significant agronomic weaknesses.

## SPRING OATS

ASCOT (Wiersum, Netherlands/Nickerson, Rothwell)

A provisional recommendation with useful yield potential. Quality, in terms of kernel content, screenings and specific weight look inferior to Firth. Late maturity will further limit its potential use in Scotland. It produces tall rather weak straw.

HUSKY (Nordsaat, Germany/Saaten Union UK Ltd, Newmarket)

A new provisional recommendation but needs more evidence before Scottish growers and millers are likely to support it. Early maturity and relatively stiff straw with good mildew resistance look promising and it is close to Firth in specific weight and kernel content.

ATEGO (Selgen, Czech Republic/Trevor Cope Seeds Ltd.)

A provisional recommendation that needs very careful protection against mildew if its yield potential is to be achieved. Although kernel content is low, one miller is impressed by it, so far! Its maturity and stiff short straw could be useful.

WINSTON (Lochow-Petkus, Germany/Nickerson, Rothwell)

Recommended for its quality, resistance to mildew and short stiff straw. It is very similar to Firth but continues to lack market share (3% of UK seed area 2007). Although milling potential looks provisionally good apart from a tendency to produce discoloured groats, there are signs that it doesn't meet miller expectations.

FIRTH (Lochow-Petkus, Germany/CPB Twyford Ltd., Cambridge)

Recommended for its reliability, agronomic characters and quality. This combination has created a dominant position at 45% of the 2007 UK seed area. For millers it has a combination of good kernel content, low screenings and moderate specific weight; they also value its reliability and speed through the mill. In 2001 it showed a tendency to free-shell; reducing the drum speed should alleviate this problem if it reoccurs.

DRUMMER (Lochow-Petkus, Germany/Nickerson, Rothwell)

Becoming outclassed with only 2% of the 2007 UK seed market. Milling support is lukewarm with comments about variable milling yield and a rather mixed groat size. Straw is tall, weak and needs stiffening.

LEVEN (Lochow-Petkus, Germany/CPB Twyford Ltd., Cambridge)

This provisional recommendation has a high kernel content and is attracting very strong milling interest. It is stiff, early and has good mildew resistance but yield potential looks rather limited; it could have potential in organic and conservation grade systems where its yield will be more competitive.

## WINTER OATS

Winter oats are widely grown. Earliness and yield relative to spring oats are major benefits. There is a substantial milling market for winter oats in Scotland: some of this must be PGR-free. Achieving PGR-free winter oats is likely to be more challenging than achieving PGR-free spring oats. As winter oats are less hardy than winter wheat and winter barley, they should be sown early to reduce the risk of winter-kill and plant heave. The yields given in the table are UK yields.

TARDIS (IGER, Aberystwyth/Senova Ltd., Cambridge)

This provisional recommendation has produced variable yields in Scotland, below its UK average. It is unlikely to become popular with millers as its kernel content is only equivalent to Gerald and the specific weight is much lower. On current evidence it doesn't have any obvious agronomic weaknesses.

SW KINROSS (Senova Ltd., Cambridge)

It has yielded well in those years that SW Dalguise has been disappointing but has failed to gain significant market share. Its relatively good mildew resistance and very tall straw might suit organic systems but its yields in the absence of PGR have been relatively disappointing. Its quality characteristics are unlikely to suit millers.

SW DALGUISE (Senova Ltd., Cambridge)

Yield in Scotland has been very variable with excellent yields in 2002 and 2004 but relatively disappointing yields in the last three years. On some sites lodging has reached very high levels, indicating risk if PGR is omitted. It is early ripening. It has milling support with good colour, size and specific weight but recently milling yields have been a bit variable with unexpectedly high groat breakage. Crown rust and mildew resistance are poor. Winter hardiness is above average.

BROCHAN (IGER, Aberystwyth/Senova Ltd., Cambridge)

This provisional recommendation has a kernel content much better than Gerald but specific weight could limit acceptability for some buyers. Preliminary milling trials have produced excellent results. Short stiff straw could be useful when grown for the PGR-free market; it has yielded well in PGR-free trials. It has limited resistance to mildew.

MASCANI (IGER, Aberystwyth/Senova Ltd., Cambridge)

A recommendation for its very high milling potential, based on an excellent kernel content, high specific weight and low screenings; recent observations also indicate it is relatively free of discoloration. Yields are disappointing especially in Scotland where Gerald out-yields it by 5%. It is relatively stiff and yields well in PGR-free trials. It has relatively good resistance to mildew but could be affected by the Millennium race of crown rust.

GERALD (IGER, Aberystwyth/Senova Ltd., Cambridge)

Historically popular with growers and acceptable to millers although higher kernel content varieties are changing this perception. It maintains its yield rather better in Scotland with 2007 being a particularly good year in trials. The straw is short and suited to PGR-free systems. Mildew resistance is weak.

## NAKED OATS

Naked oats yield below 80% of the conventional varieties but they have the potential to earn a premium and should be grown on contract. The terms of the contract have an important bearing on the profitability of the crop. Naked oats should be regarded with some caution as they must not be harvested before fully mature and particular care is needed in drying and handling this crop. Information on naked varieties may be obtained from the HGCA website. There is a market for naked oats in the poultry industry.

## SPECIAL RECOMMENDATIONS FOR THE WEST

A few varieties perform rather better or worse in the wetter conditions of the west than in the drier east, these are highlighted in this section:

### Spring barley:

Riviera continues to produce competitive yields in SW Scotland; Westminster also yields well and looks useful for whole-crop. Waggon has produced excellent yields but with a risk of severe *Rhynchosporium* infection if unprotected. Publican is also high yielding with much better *Rhynchosporium* resistance than Waggon but not such stiff straw and not as early. Oxbridge, NFC Tipple, Quench and Optic have underperformed while Rebecca has produced variable results.

### Winter barley:

Of the six-rows Sequel has done relatively better in the West: for those who can cope with a low specific weight, high yielding Pelican is a good choice. Amarena should be avoided. The stiff two-row varieties Saffron and Accrue have also done relatively well.

### Winter wheat:

For distilling: Istabraq and Alchemy have yielded well: Robigus is penalised as it is a disappointing second cereal. Consort under-performs.

For bread-making: Solstice yields well in the West with a substantial advantage over Malacca. Einstein out-yields Cordiale but the latter has the advantage of being earlier and stiffer.

For whole-crop: In the absence of yellow rust, Robigus yields well providing it follows a break crop. If following a cereal, Istabraq is worth considering but watch its vulnerability to lodging and mildew Alchemy looks promising.

**For further information consult your local SAC Advisory Office.**

SAC Cereal Specialists may be contacted at:

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**SAC is grateful to the HGCA for funding cereal variety testing.**

The HGCA Recommended Lists are independently managed by Crop Evaluation Limited.

**SAC receives financial support from the Scottish Government for variety testing and promotion.**

SAC RECOMMENDED CEREALS 2008

Year First Listed	Grain yield as a % of fungicide treated controls	Yield loss if untreated %	Use B=brewing D=distilling GD=grain distilling	Mating Approval†	Screenings <2.5 mm %	Specific weight kg/hl	Resistance to ear loss 1-9 poor-good	Maturity days -earlier than average	Straw strength 1-9 weak-strong	Straw length cm	Brackling risk 1-9 high-low	Disease 1 = susceptible Mildew 9 = resistant Rhyncho-sporium	Green leaf area retention	Diversification group‡
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SPRING BARLEY (100 = 7.3 t/ha, 58 cwt/acre)

2005	R	Waggon	106	11	Feed	No	7.7	67.8	8	-1	9	8	9	4	7	1
2005	R	NFC Tipple	104	12	B	*	6.8	68.6	8	0	9	8	9	4	7	1
2004	R	Rebecca	102	10	Feed	No	7.9	66.9	8	0	8	4	6	8	8	14
2003	R	Cocktail	101	12	B & D	*	10.0	69.9	8	0	9	9	7	5	5	4
2005	R	Westminster	101	7	B	*	6.0	70.2	7	+1	8	6	9	8	8	1
2004	O	Doyen	101	9	Feed	No	7.3	68.9	8	0	9	7	7	7	6	3
2005	R	Oxbridge	100	10	D	*	5.2	69.7	8	0	9	8	7	7	5	14
1995	R	Optic	97	16	B & D	*	8.6	69.9	7	+1	8	5	5	4	6	9
1995	O	Riviera	97	9	Feed	No	5.7	70.6	6	-2	7	7	8	5	7	1
1999	R	Decanter	94	8	D & GD	*	10.2	69.6	8	-1	9	8	9	6	6	1
2008	P1	Scout	108	12	Feed	No	7.6	68.9	-	0	8	8	8	5	6	1
2007	P2	Quench	106	11	B	(*)	7.6	67.9	8	+1	8	8	9	8	6	1
2007	P2	Publican	105	9	B & D	(*)D	5.4	69.2	7	+1	8	7	8	8	8	1
2006	P3	Appaloosa	103	13	D	*	10.1	68.1	7	0	9	8	9	4	7	1
2008	P1	Belgravia	101	7	B, D & GD	-	8.1	68.4	-	0	7	7	9	7	8	1

		Suitability light soils 1-9																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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2005	R	Amarena	107	14	8	No	15.8	64.4	7	-1	7	106	9		8	1
2006	R	Boost	107	21	7	No	9.7	69.2	7	-2	7	105	7		8	10
2003	R	Sequel	103	19	8	No	18.1	69.8	7	-1	7	110	5		7	10
2005	R	Saffron	103	19	6	No	8.2	70.3	8	+1	8	92	3		8	10
2004	O	Camion	102	20	7	No	7.9	71.3	7	-1	7	92	5		8	0
1999	S	Pearl	99	17	6	*B	6.9	70.6	7	+1	7	102	6		5	0
2007	P2	Bronx	114	23	6	No	29.4	67.6	7	-2	5	109	7		8	0
2007	P2	Retriever	111	26	7	No	18.5	66.6	8	-1	6	88	5		7	0
2007	P2	Pelican	111	18	7	No	15.2	64.6	7	0	7	108	8		6	0
2007	P2	Accrue	104	16	8	No	15.2	69.9	7	+1	8	91	6		8	0

		Quality Markets														
		Suitability as 2nd cereal 1-9 poor-good	Distilling	Biscuit	Bread	Specific weight kg/hl	Hagberg falling number	Maturity days	Straw strength 1-9	Straw length cm	Resistance to sprouting 1-9	Mildew	Yellow rust	Septoria nodorum	Septoria tritici	Diversification Group‡
WINTER WHEAT (100 = 10.1 t/ha, 80 cwt/acre)																
2004	R	Istabraq	105	21	6	Good	Poor	Poor	78.2	207	+1	6	95	5	9	1
2006	R	Alchemy	104	15	4	Medium	Poor	Poor	77.3	247	+1	7	92	-	9	1
2003	R	Robigus	102	19	2	Medium	Good	Poor	76.5	206	0	7	90	5	3	7
2003	R	Einstein	102	18	7	Poor	Poor	Poor	77.2	266	-1	7	88	6	6	10
2004	S	Cordiale	100	23	7	Poor	Poor	Medium	79.3	304	-3	8	82	7	7	4
1995	O	Consort	100	28	8	Medium	Good	Poor	76.8	226	+2	8	86	6	7	7
2002	S	Solstice	98	20	5	Poor	Poor	Good	78.4	272	0	8	95	7	5	1
1999	O	Malacca	95	19	6	Poor	Poor	Poor	75.3	312	-2	7	86	6	8	1
2007	P2	Oakley	110	21	4	Poor	Poor	Poor	75.5	165	0	6	87	-	6	10

Colour code

Good

Tends to be good

Intermediate

Tends to be poor

Poor

R = Recommended for general use

S = Specific use variety

P = Provisional

O=No longer in trial, becoming outclassed

† As assessed by the Maltng Barley Committee

\* Approved as a malting variety

(\*) Provisionally Approved as a malting variety

NB See variety description for TARTAN spring barley

UK Grain yield as a % of fungicide treated controls

Yield loss if untreated %

% Kernel content

Screenings %<2.0mm

Specific weight kg/hl

Maturity days + later -earlier than average

Straw strength 1-9 weak-strong

Straw length cm

Crown Rust 1-9

Mildew 1-9

**SPRING OATS** (100 = 7.0 t/ha, 56 cwt/acre)

1999	R	Winston	100	10	76.3	0.1	54.8	+1	7	109	5	8
2000	R	Firth	100	11	75.8	0.2	54.5	+1	6	109	5	8
1997	O	Drummer	98	10	72.6	0.3	55.1	0	6	122	5	7
2007	P2	Ascot	105	14	73.3	0.3	52.9	+3	6	120	5	6
2008	P1	Husky	103	12	-	-	55.0	-2	7	116	4	8
2007	P2	Atego	102	20	72.8	0.1	53.4	-1	7	109	6	4
2007	P2	Leven	97	9	77.1	0	54.5	-1	8	111	5	8

**WINTER OATS** (100 = 8.2 t/ha, 65 cwt/acre)

2004	O	SW Kinross	102	8	74.9	0.5	53.0	+1	5	130	6	6
2003	R	SW Dalguise	101	15	75.4	0.2	54.6	-1	5	123	3	3
2004	R	Mascani	100	5	78.0	0.1	54.5	0	6	120	8	6
1999	R	Gerald	99	12	72.5	0.2	53.3	+1	6	120	4	4
2007	P2	Tardis	105	11	72.7	0	49.9	-1	6	112	7	8
2007	P2	Brochan	101	11	77.6	0	50.5	+2	7	110	7	4

**SPRING WHEAT** (100 = 7.8 t/ha, 62 cwt/acre)

2003	R	Tybalt	107		2	286	75.5	0	3	90	6	9
2001	R	Ashby	101		2	297	77.7	+1	7	91	5	7
1999	S	Paragon	92		1	290	76.4	0	6	98	5	6

**Colour code** Good Tends to be good Intermediate Tends to be poor Poor

R = Recommended for general use	P = Provisional
S = Specific use variety	O = Becoming outclassed

The full data collected and the HGCA Recommended Lists are available on the HGCA website ([www.hgca.com](http://www.hgca.com))